INDIANA
Epidemiology
NEWSLETTER

Indiana State Department of Health

Epidemiology Resource Center
2 North Meridian Street, 3-D
Indianapolis, IN 46204
317/233-7416

June 2003
Vol. XI, No. 6

Peak Pertussis Season Approaching

Wayne Staggs, MS
ISDH Epidemiology Resource Center

Jon Radosevic, M(ASCP), RM(AAM)
ISDH Disease Control Lab

Introduction and Background

Pertussis is the most frequently reported vaccine-preventable disease among children less than five years of age, but increased reporting of cases in adolescents and adults has been observed nationally and in Indiana during the 1990s. Although pertussis has no distinct seasonal pattern (cases are reported in every month of the year in the U.S.), incidence does increase during the summer and early fall months. This report will summarize Indiana data on incidence of pertussis by age and seasonality and provide recommendations on pertussis prevention and control.

In 2002, 183 cases in Indiana met the confirmed or probable case definition for pertussis, the second highest number of cases reported in any year since 1985 (there were 185 cases reported in 1998). A confirmed case of pertussis is defined as:

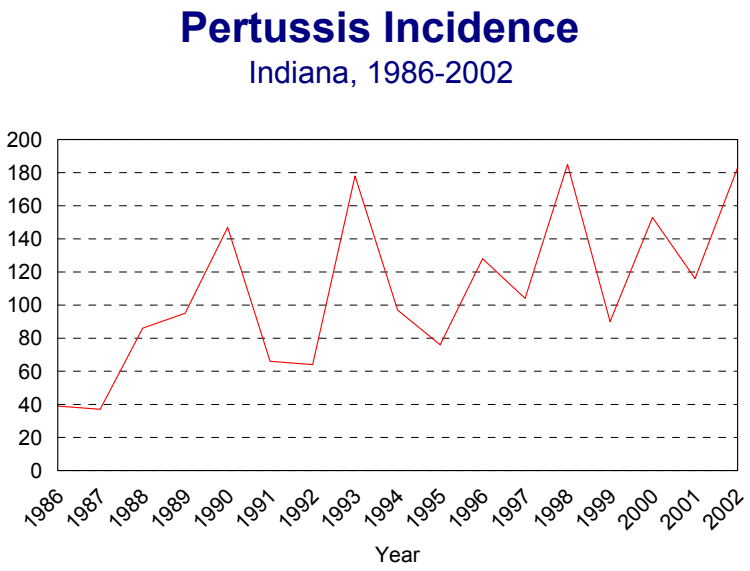
1) a person with an acute cough illness of any duration who is culture positive, or
2) a case that meets the probable case definition and is confirmed by PCR, or
3) a case that meets the probable case definition and is epidemiologically linked directly to a case confirmed by either culture or PCR.

The **probable** case definition is a person with a cough illness lasting at least two weeks with one of the following: paroxysms of coughing, inspiratory whoop, or post-tussive vomiting. A probable case is not culture or PCR confirmed or is not linked to a laboratory confirmed case.

Table of Contents:

Figure 1 shows the general increase in pertussis incidence in Indiana as well as the typical cyclical pattern of pertussis since 1986. Nationally as well as in Indiana, reported pertussis incidence has increased since the 1980s. The increase has been primarily in adolescent and adult cases, but reasons for the rise are not completely clear. It has been suggested that improvements in diagnosis and reporting are felt to have contributed to the increase in the older age groups.

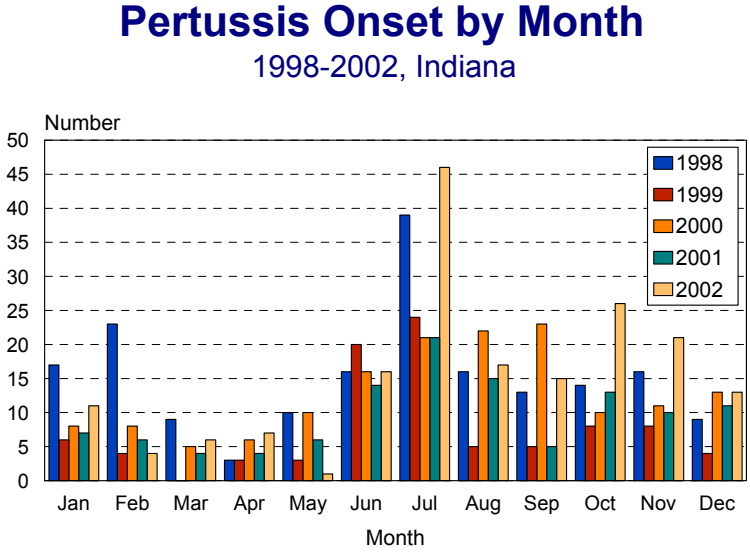
Figure 1.



Seasonality

Pertussis can occur during any month of the year. From 1998-2002, there has been at least one case of pertussis reported monthly in Indiana except March 1999. July had the highest incidence in four of the five years. In addition, analysis by month over the five year period shows that 20.8% (151/727) of all cases were reported in July. During the past five years, pertussis onset tends to be highest during the June-September period, representing 50.8% of the cases (see Figure 2).

Figure 2.



Age-Related Pertussis

Pertussis incidence has increased since the 1980s with adolescents and adults accounting for a major portion of the rise in cases. Table 1 shows the general increase by decade and Figure 3 shows the breakdown of cases by age group from 1998-2002. The highest incidence occurs among those less than one year of age, ranging from 27- 43% of cases during the last five years. As noted earlier and as seen in Figure 4, an increase in the percentage of cases attributable to persons 10 years old and older has occurred. The spike in cases in 2002 among the 1-4 year age group was the result of an outbreak in LaGrange County among a poorly vaccinated population (see *Indiana Epidemiology Newsletter*, September, 2002). Figure 5 shows the total number of cases compared to the cases that are 10 years and older from 1991-2002. A slight increase in the number of cases 10 years and older is evident from 1991-1999, and then a dramatic increase is indicated from 2000 to 2002.

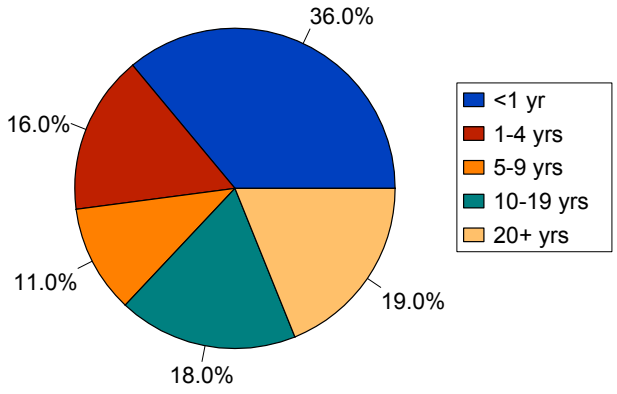
Table 1.

Pertussis Incidence
Selected Decades, Indiana

Decade	Average Number Cases per Year
1950s	1077
1960	273
1970s	88
1980s	108
1990s	112
2000-02	151

Figure 3.

Pertussis Incidence
Percent of Cases by Age
Indiana, 1998-2002*



*Percent determined by total cases for five-year period

Figure 4.

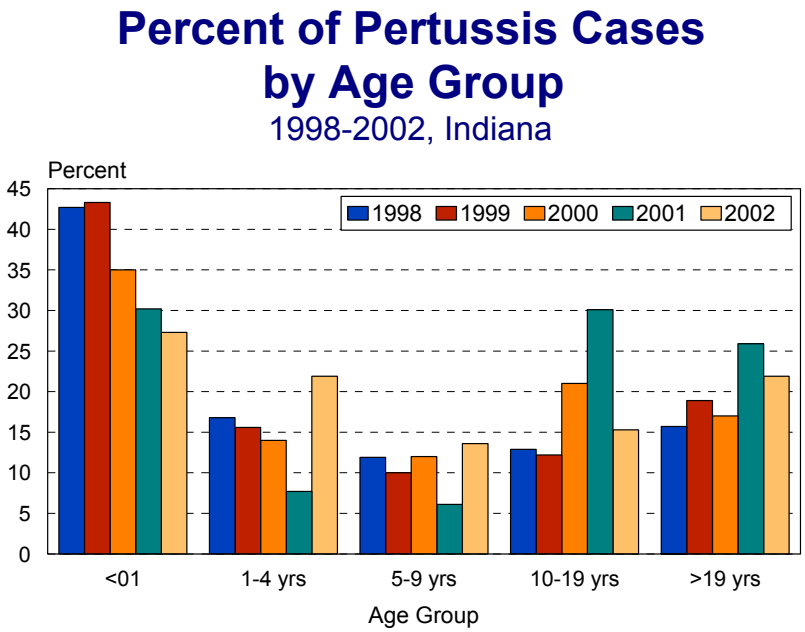
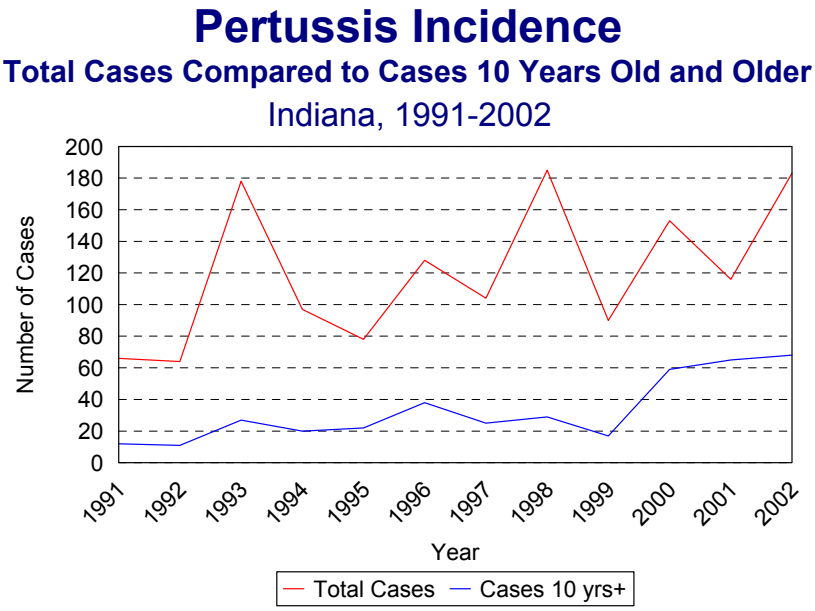


Figure 5.



Immunity to pertussis begins to wane 5-10 years following the last vaccine dose (appropriately given at 4-6 years of age), and therefore pertussis in adolescents and adults can occur even though they were fully vaccinated as children. Therefore, older children and adults often serve as the source of infection for infants, who are at risk for the most severe consequences of infection. The disease may be milder in older persons, so often the infected adult or adolescent is not identified until the infant has been hospitalized and/or diagnosed. Many other adults and adolescents most likely go undiagnosed and serve as sources of infection in the family and community. A recent prospective study (1) conducted among adolescents and adults (10-49 years of age) in a managed care organization in Minnesota reported that "…the estimated annual incidence of pertussis was 507 cases per 100,000 person-years". The study published in the May 1, 2001 issue of *The Journal of Infectious Diseases* concluded that *Bordetella pertussis* maybe a more common cause of cough illness among adolescents and adults than was

recognized previously. The study further suggests that a booster dose of acellular pertussis vaccine at entry to middle school may be an effective strategy to prevent pertussis among U.S. adolescents.

The ISDH offers the following recommendations for prevention and control of pertussis:

- Insure all children eligible for pertussis vaccination are up-to-date with DTaP vaccine.
- Consider the diagnosis of pertussis in acute cough illness, regardless of the age of the patient, especially if the cough is associated with post-tussive vomiting and or gagging or if the cough persists for two weeks or longer.
- Report any suspected case of pertussis to your local or state health department immediately, so that control measures can be implemented. If pertussis is strongly suspected you should not wait for laboratory results before reporting.
- Both culture and DFA testing should be performed on all suspected cases and symptomatic contacts of cases prior to the administration of antibiotics. (See side bar related to diagnostic testing.)

Additional, more specific control measures can be obtained by calling Wayne Staggs, epidemiologist, Indiana State Department of Health at 317-233-7112 or email wstaggs@isdh.state.in.us.

References

(1) Strebel, P, Nordin J, et al. Population-based incidence of pertussis among adolescents and adults, Minnesota, 1995-1996. J Infect Dis 2001;183:1353-1359.

Diagnostic Testing of Suspect Cases

The organism is most easily recovered from nasopharyngeal mucus in the catarrhal or early paroxysmal stages, and is rarely recovered after the fourth week of illness. It is recommended that both culture and DFA be performed. False positive and false negative DFA results may occur. A positive culture is diagnostic, whereas false-negative cultures are common in patients receiving antibiotics. Because of difficulties with laboratory testing, clinicians often must make the diagnosis on the basis of clinical findings such as inspiratory whoop, post-tussive emesis and lymphocytosis. All symptomatic contacts to cases should be cultured prior to receiving antibiotic treatment, as well as all patients with an unexplained, sleep-disturbing cough. Special attention should be paid to infants, as well as adolescents and adults with mild illness that could represent pertussis. There is no charge for pertussis testing performed by the ISDH Laboratory. Pertussis test kit 2A may be obtained by writing or calling:

Container Section - Rm. 13 G
Medical Science Building, IUPUI Campus
635 North Barnhill Drive
Indianapolis, Indiana 46207-7202
Telephone: (317) 233-8104

Directions for submitting specimens are enclosed in the pertussis test kit. For best results, pertussis specimens should be received in the ISDH Laboratory within 24 hours of collection (an overnight express is the preferred shipping method). For additional help with specimen handling and shipment or test result interpretation, call the Special Reference Bacteriology Laboratory at 317/233-8040.

Laboratories are encouraged to submit pertussis cultures to the ISDH Special Reference Bacteriology Laboratory.. The State Laboratory, in conjunction with the CDC Laboratories, can conduct antibiotic resistance testing and genotyping of pertussis isolates. This information would add to the public health implications and epidemiological understanding of the organism. Please call the Special Reference Bacteriology Laboratory at 317-233-8040 for questions about shipping pertussis cultures to the State Laboratory.

Increase of Invasive Group A Streptococcal Infection Prompts the Need to Educate Public About Prevention

Thomas Kerr, BS, RN
ISDH Epidemiology Resource Center

The recent increase of reported invasive Group A Strep (GAS) cases has prompted the Indiana State Department of Health to inform residents how to protect themselves from this rare and sometimes fatal disease. The numbers of cases of invasive GAS vary annually. From January through April 2003 there were 71 cases compared to 44 cases reported from the same period in 2002.

Group A *Streptococcus* is a bacterium often found in the throat and on the skin. People may carry group A streptococci in the throat or on the skin and have no symptoms of illness. Most GAS infections are relatively mild illnesses such as strep throat or impetigo. On rare occasions, these bacteria can cause other severe and even life-threatening diseases.

How is GAS spread?

- These bacteria are spread through direct contact with mucus from the nose or throat of persons who are infected or through contact with infected wounds or sores on the skin.
- Ill persons, such as those who have strep throat or skin infections, are most likely to spread the infection.
- Persons who carry the bacteria but have no symptoms are much less contagious. Treating an infected person with an antibiotic for 24 hours or longer generally eliminates transmission of the bacteria. However, it is important to complete the entire course of antibiotics as prescribed.
- It is not likely that household items like plates, cups, or toys facilitate spreading these bacteria.

Common Streptococcal Illnesses

- **Strep throat**, the most common illness caused by this bacterium, is easily treated with a 10-day course of conventional antibiotics, usually penicillin. If left untreated or partially treated, however, it can be followed by rheumatic fever, which may result in permanent damage to the heart valves. Rheumatic fever, currently a rare disease, may occur when patients do not complete a full course of antibiotics to treat strep throat.
- A fever, sore throat, red sandpaper-like rash and a red "strawberry" tongue characterize **scarlet fever.** It is caused by several different strains of the streptococcal bacteria, all of which produce a toxin that causes the characteristic red rash. It is treated in the same manner as strep throat.
- **Impetigo** is the second most frequent illness caused by group bacteria. This is a mild skin infection accompanied by open, draining sores. Complications are rare. It is easily treated with common antibiotics.
- Rare and more serious, **glomerulonephritis** is a complication of streptococcal infections, usually strep throat or impetigo. Antibiotic treatment of the original infection does not necessarily prevent the condition, which usually resolves itself.

Invasive Infections

Infection occurs when GAS bacteria invade other parts of the body including blood and tissue. A person with GAS infection will not automatically develop invasive infection. Invasive GAS infection usually develops when a person has a weakened immune system due to other medical conditions or has an open cut on the skin that allows the bacteria to be absorbed into the tissue. However, some strains of GAS may cause invasive disease in otherwise healthy individuals.

Certain strains of GAS can lead to several forms of invasive disease, including pneumonia, meningitis, infection of the bone and an illness resembling toxic shock syndrome. Relatively uncommon, these streptococcal diseases first caught the public's notice in the late 1980s, when published reports in medical journals began to draw attention to them. The death of Muppet creator Jim Henson in 1990 as a result of an aggressive strep infection brought more visibility. In 1994, focus moved to the strain of group A *Streptococcus* causing necrotizing fasciitis.

Necrotizing Fasciitis

Necrotizing fasciitis is the medical term for a serious skin and muscle infection caused by certain strains of group A *Streptococcus*. These bacteria produce an enzyme that destroys tissue. While it occurs in less than 10 percent of the patients who develop an invasive group A infection, it can be fatal in 20 percent to 30 percent of these cases.

If necrotizing fasciitis does develop, it is usually in the wake of a skin wound that has allowed the bacteria to enter the body. The bacteria multiply in the wound and produce a toxic substance that kills skin, muscle tissue and the membrane covering the muscles. Not everyone infected with the bacteria will become ill, although the reason for this is unknown.

As is the case with other strains of group A *Streptococcus*, those that cause necrotizing fasciitis are treated with common antibiotics, although not necessarily the same ones used to treat milder diseases. Because of the extensive tissue damage associated with this kind of infection, physicians sometimes combine a regimen of antibiotics with the surgical removal of severely damaged skin and muscle tissue.

Incidence in Indiana

Indiana hospitals, physicians and other health care providers are required to report invasive GAS infections to local health departments (Figures 1, 2, and 3.).

Figure 1.

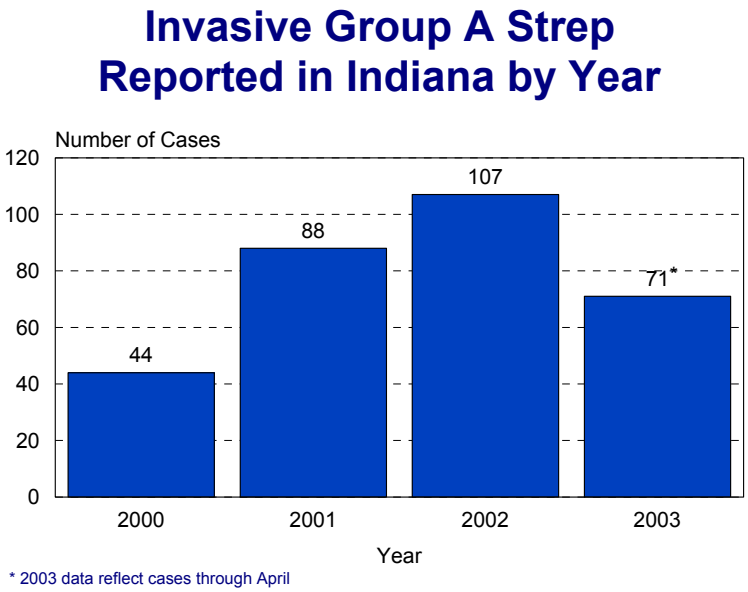


Figure 2.

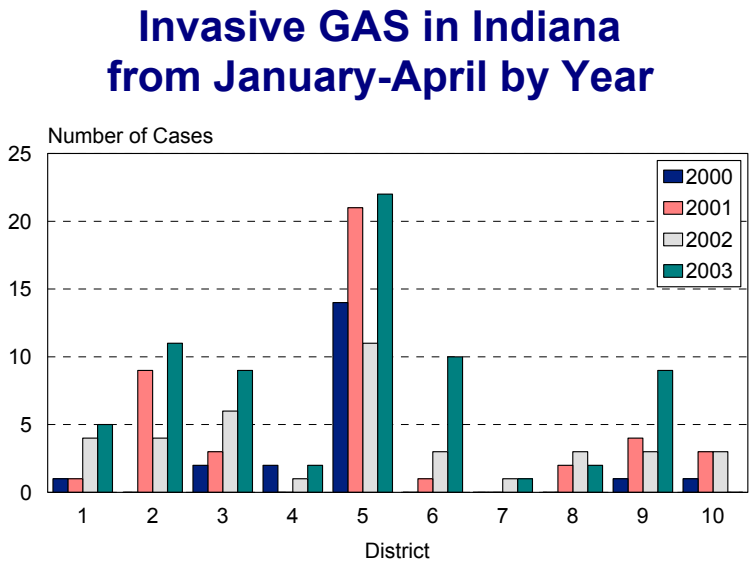
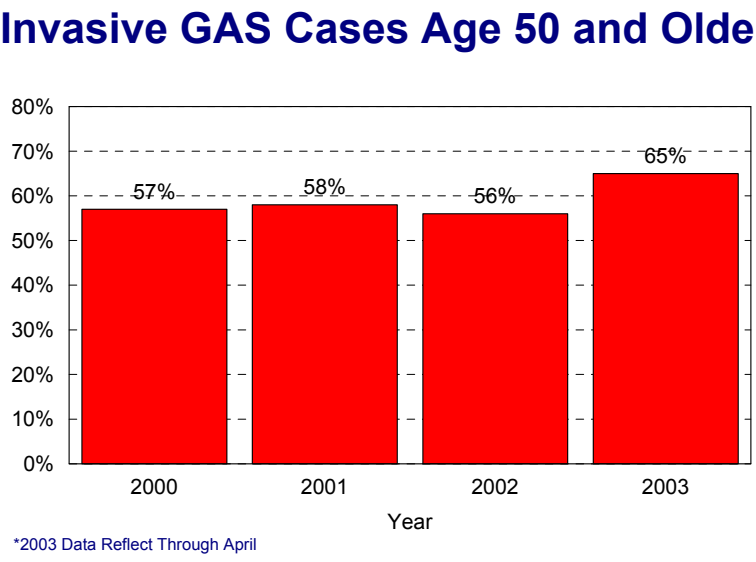


Figure 3.



Treatment

Group A *Streptococcus* bacteria are known to be sensitive to penicillin, so it is the preferred antibiotic for most types of streptococcal infections. However, necrotizing fasciitis is more effectively treated with penicillin in combination with clindamycin, or another antibiotic, and surgery.

Prevention of Invasive group A Streptococcal Infections

The spread of all types of group A *Streptococcus* infections may be reduced by:

- Completing the course of antibiotics as prescribed
- Covering one's mouth and nose when coughing/sneezing
- Wash hands after coughing and sneezing
- Wash hands before preparing foods and before eating
- Persons with sore throats should be seen by a doctor who can perform tests to find out whether the infection is strep throat; if so, the person should stay home from work, school or day care until 24 hours or more after taking an antibiotic.
- Since it is not clear why some infected persons develop necrotizing fasciitis and others do not, it is important that wounds be kept clean and covered with bandages. If a person has an infection (redness or inflammation around a wound) that does not stay centrally located, seek medical attention as soon as possible.

For more information on invasive group A streptococcal disease, contact your county health department or the Indiana State Department of Health.

Links: http://www.cdc.gov/ncidod/dbmd/diseaseinfo/groupastreptococcal_g.htm

---

TRAINING ROOM

Epidemiology and Prevention of Vaccine-Preventable Diseases

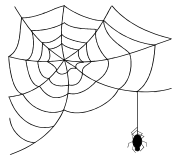
When: **September 9-10, 2003**

Time: **8:00 am to 5:00 pm**

Where: **Adam's Mark Hotel, 120 W. Market Street, Downtown Indianapolis**

Cost: **$75.00 for 2-day session (breakfast, lunch, & breaks provided)**

Registration: **Thru smeechhinh@iupui.edu**



Wonderful Wide Web Sites

ISDH Data Reports Available

The ISDH Epidemiology Resource Center has the following data reports and the Indiana Epidemiology Newsletter available on the ISDH Web Page:

http://www.in.gov/isdh/dataandstats/epidem/epinews_index.htm

Indiana Cancer Incidence Report (1990, 95,96, 97)

Indiana Cancer Mortality Report (1990-94, 1992-96)

Indiana Health Behavior Risk Factors (1995-96, 97, 98, 99, 2000, 2001)

Indiana Hospital Consumer Guide (1996)

Public, Hospital Discharge Data (1999, 2000, 2001)

Indiana Maternal & Child Health Outcomes & Performance Measures (1988-97, 1989-98, 1990-99, 1991-2000)

Indiana Marriage Report (1995, 97, 98, 99, 2000)

Indiana Mortality Report (1999, 2000, 2001)

Indiana Natality Report (1998, 99, 2000, 2001)

Indiana Induced Termination of Pregnancy Report (1998, 99, 2000)

Indiana Infectious Diseases Report (2000)

Former Indiana Report of Diseases of Public Health Interest (1996, 97, 98, 99)

HIV Disease Summary

Information as of May 31, 2003 (based on 2000 population of 6,080,485)

HIV - without AIDS to date:

396	New HIV cases from June 2002 thru May 2003	12-month incidence	6.51 cases/100,000
3,729	Total HIV-positive, alive and without AIDS on May 31, 2003	Point prevalence	61.33 cases/100,000

AIDS cases to date:

502	New AIDS cases from June 2002 thru May 2003	12-month incidence	8.26 cases/100,000
3,382	Total AIDS cases, alive on May 31, 2003	Point prevalence	55.63 cases/100,000
7,135	Total AIDS cases, cumulative (alive and dead)		

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in May *MMWR* Week 19-22		Cumulative Cases Reported January - May *MMWR* Weeks 1-22	
	2002	2003	2002	2003
Campylobacteriosis	43	33	122	101
Chlamydia	1,235	1,361	6,988	6,918
E. coli O157:H7	6	5	15	16
Hepatitis A	3	7	23	18
Hepatitis B	0	0	9	10
Invasive Drug Resistant *S. pneumoniae* (DRSP)	28	11	100	83
Gonorrhea	496	481	2,999	2,658
Legionellosis	2	2	4	5
Lyme Disease	0	0	2	4
Measles	0	0	0	0
Meningococcal, invasive	4	3	20	20
Pertussis	3	5	18	25
Rocky Mountain Spotted Fever	0	0	0	0
Salmonellosis	46	80	149	188
Shigellosis	9	14	31	51
Syphilis (Primary and Secondary)	2	4	25	18
Tuberculosis	13	9	46	50
Animal Rabies	2 (1 bat, 1 skunk)	0	5 (4 bats, 1 skunk)	2 (bats)

For information on reporting of communicable diseases in Indiana, call the *ISDH Communicable Disease Division* at (317) 233-7665.

Indiana
Epidemiology
Newsletter

The *Indiana Epidemiology Newsletter* is published by the Indiana State Department of Health to provide epidemiologic information to Indiana health professionals and to the public health community.